WHAT IS CLAIMED IS:

1. A tuning assembly for tuning the resonant frequency of a resonator, the resonator comprising a capacitor and an inductor, the tuning assembly comprising:

(a) a superconductive tuning tip; and

(b) an actuator operatively linked to the tuning tip and configured and arranged to position the tuning tip at a range of distances from the resonator, the range being sufficient to cause the resonant frequency of the resonator to vary by at least about 1% of the resonant frequency.

2. The tuning assembly of claim 1, wherein the actuator is further configured and arranged to vary the distance between the tuning tip and the resonator in steps that correspond to resonant frequency changes of about 0.01% or less of the resonant frequency.

3. The tuning assembly of claim 1, wherein the actuator comprises a driver and moving arm connecting between the driver and the tuning tip.

4. The tuning assembly of claim 3, wherein the driver comprises an electrical motor.

5. The tuning assembly of claim 3 wherein the tuning tip is a superconductor having a size at least as large as a footprint of the inductor.

6. The tuning assembly of claim 3, wherein the driver is configured and arranged to operate at a higher temperature than the tuning tip, and wherein the moving arm comprises a thermal isolator positioned between the tuning tip and the driver.

7. The tuning assembly of claim 1, further comprising a position sensing device configured so as to measure the position of the tuning tip.

8. The tuning assembly of claim 7, wherein the position sensing device is a reflective device.

9. The tuning assembly of claim 7, wherein the position-sensing device is a direct reading device.

10. The tuning assembly of claim 7, wherein the position-sensing device is a beam path interruption device.

11. The tuning assembly of claim 7, wherein the position sensing device and actuator are employed in a closed-loop feedback control system intended to control the distance between the tuning tip and the resonator.

12. The tuning assembly of claim 1, further comprising a frequency sensing device for measuring output frequency of the resonator.

13. The tuning assembly of claim 12, wherein the frequency sensing device and actuator are employed in a closed-loop feedback control system intended to control the distance between the tuning tip and the resonator.

14. A tuning assembly for tuning the resonant frequency of a resonator, the resonator comprising a capacitor and an inductor, the tuning assembly comprising:

(a) a plurality of tuning tips, at least one of the tuning tips comprising a superconductor; and

(b) a plurality of actuators, each actuator being operatively linked to a corresponding tuning tip, each actuator being configured to position the corresponding tuning tip over a range of distances from the resonator.

15. The tuning assembly of claim 14, wherein the tuning assembly further comprises a varactor corresponding to a tuning tip comprising a superconductor, the varactor

being configured to alter the resonant frequency of the resonator over a range of frequencies, wherein the range of frequencies altered by the varactor is smaller than the range of frequency variation caused by the tuning tip.

15. The tuning assembly of claim 14, wherein a first one of the plurality of actuators is configured to position its corresponding tuning tip over a range of distances from the inductor, and a second one of the plurality of actuators is configured to position its corresponding tuning tip over a ranged of distances from the capacitor, as least one of the tuning tips corresponding to the first and second actuators comprises a superconductor.

16. The tuning assembly of claim 14, wherein at least one of the plurality of the tuning tips is made of a dielectric material.

17. A tuning assembly for tuning a filter, the assembly comprising:

(a) a tuning tip comprising a superconductor; and

(b) an actuator operatively linked to the tuning tip and configured to position the tuning tip at a range of distances from at least a portion of the filter, the range of distances corresponding to a range of bandwidths of the filter.

18. The tuning assembly of claim 17, wherein the range of bandwidths is at least about 10% of the bandwidths.

19. A tunable filter, comprising:

(a) a planar filter having at least a resonator;

(b) a tuning assembly, comprising:

(i) a tuning tip;

(ii) an actuator operatively linked to the tuning tip and configured and arranged to position the tuning tip at a range of distances from the resonator, the range being sufficient to cause the resonant frequency of

the resonator to vary by at least about 1% of the resonant frequency, the tuning tip being configured and arrange to maintain the Q-factor of the resonator to be at least 10,000.

20. A method of tuning a filter having at least one resonator, the method comprising:

(a) positioning a tuning tip at a range of distances from the resonator, the range being sufficient to cause the resonant frequency of the resonator to vary by at least about 1% of the resonant frequency; and

(b) maintaining the Q-factor of the filter at not less than 10,000.